

## **REMARKS**

Reconsideration of the present application, as amended, is respectfully requested

### **I. STATUS OF THE CLAIMS**

Claims 1, 2, 5-8, 12, 13, 16-19, 22-23 and 26-30 are pending in this application. Claims 1, 12, 19 and 23 have been amended to further clarify that "...the Ni-based metal layer comprised of the nickel alloy for silicide is a nickel alloy layer including greater than 0 to about 20 % of a material selected from the group consisting essentially one of Ta, Zr, Ti, Hf, W, Ce, Pt, Pd, V, Nb, or any combination thereof." Additionally, claims 27-30 have been amended to further clarify that "... the nickel alloy layer includes greater than 0 to about 20 % of only one of the materials of Ta, Zr, Hf, Pt, Pd, V, Nb, or any combination thereof." Moreover, new claim 31 has been added.

Support for the above amendments and new claim may be found throughout the specification as originally filed. No new matter has been added by virtue of this amendment.

### **II. Claim Objections**

Claims 27-30 has been objected to on the grounds that they are not written in proper dependent format because according to the Examiner these dependent claims fail to further limit the subject matter of the previous claim from which they each depend.

In response, Applicants respectfully disagree with the Examiners position. However, in order to expedite prosecution of the present application, as discussed above, claims 27-30 have been amended to further clarify that "... the nickel alloy layer includes greater than 0 to about 20 % of only one of the materials of Ta, Zr, Hf, Pt, Pd, V, Nb, or any combination thereof."

It is noted that claims 27-30 do further limit the scope of claims 1, 12, 19 and 23 from which they depend. In particular, independent claims 1, 12, 19 and 23, each essentially recite in relevant part that "...the Ni-based metal layer is comprised of a nickel alloy for silicide is a nickel alloy layer including greater than 0 to about 20 % of a material selected from the group

consisting essentially of Ta, Zr, Ti, Hf, W, Pt, Pd, V, Nb, or any combination thereof.”

Dependent claims 27-30 each essentially recite in relevant part that “...the nickel alloy layer includes greater than 0 to about 20 % of only one of the materials of Ta, Zr, Hf, Pt, Pd, V, Nb, or any combination thereof.” Clearly, claims 27-30 do further limit the scope of claims 1, 12, 19 and 23 by not reciting the materials of “W” and “Ti, thereby further limiting the selection of the materials which can be used as part of the nickel alloy layer for silicide recited in claims 1, 12, 19 and 23.

In view of the above action taken, it is believed that the above objections have been overcome and thus removal of these objections is requested.

### **III. Claim Rejections under 35 U.S.C. §103**

**(i) Claims 1, 5-6, 12 and 16-17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,196,360 to Doan et al (hereinafter Doan) in combination with U.S. Patent No. 5,766,997 to Takeuchi (hereinafter Takeuchi).**

**(ii) Claims 2, 7-8, 13, 18-19, 22-23 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Doan with Takeuchi as applied to claims 1, 5-6, 12, and 16-17 above, and further in view of U.S. Patent No. 6,503,840B2 to Catabay et al (hereinafter Catabay), U.S. Patent No. 6,664,166 B1 to Jaiswal et al (hereinafter Jaiswal) and U.S. Patent No. 6,775,046 B2 to Hill et al (hereinafter Hill).**

**(iii) Claims 27-30 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Doan in combination with Takeuchi as applied to claims 1, 5-6 and 12, 16-17 above, and further in view of U.S. Patent Application Publication No. 2002/0151170A1 to Maex et al. (“the Maex publication”).**

In response, it is respectfully asserted that the Doan, Takeuchi, Catabay, Jaiswal, Hill and Maex references each fail to teach or suggest all of the features recited in independent method claims 1, 12, 19 and 23 of the presently claimed invention.

As mentioned above, claims 1, 12, 19 and 23 have been amended to further clarify that "...the Ni-based metal layer comprised of the nickel alloy for silicide is a nickel alloy layer including greater than 0 to about 20 % of a material selected from the group consisting essentially one of Ta, Zr, Ti, Hf, W, Co, Pt, Pd, V, Nb, or any combination thereof."

In particular, Doan and Takeuchi at the very least fail to teach or suggest a method of fabricating a semiconductor device, which includes a Ni-based metal layer comprised of the nickel alloy for silicide which is a nickel alloy layer including greater than 0 to about 20 % of a material selected from the group consisting essentially of Ta, Zr, Ti, Hf, W, Pt, Pd, V, Nb, or any combination thereof, as essentially recited in claims 1, 12, 19 and 23.

First of all, as conceded in the instant Office Action, Doan fails to teach or suggest a method which includes forming a Ni-based metal layer comprised of a nickel alloy for silicide as recited in claims 1, 12, 19 and 23. **(See page 3 of the instant Office Action).** The Examiner contends that it would have been obvious based upon the teachings of the Takeuchi reference to provide a nickel alloy layer for silicide. In support of his position, the Examiner states that Takeuchi mentions that at least one kind metal selected from the group of tungsten (W), cobalt (Co), titanium (Ti) and nickel (Ni) can be used in forming the silicide forming metal layer 41. The Examiner interprets the expression "at least one" as a disclosure by Takeuchi of mixtures of metals which are alloys.

Applicants respectfully disagree with the above interpretation by the Examiner. The fact that Takeuchi may describe that the above metals may be mixed does not necessarily disclose that the formation of an alloy of the above metals is intended. In other words, even when metals are mixed, alloys are not necessarily formed. Rather, additional steps are required for turning a mixture of metals into an alloy. However, Takeuchi is completely silent regarding using and/or

forming alloys. Thus, the disclosure of Takeuchi is insufficient for teaching or suggesting the nickel alloy layer for silicide as recited in claims 1, 12, 19 and 23.

Furthermore, beside failing to teach or suggest a metal layer for silicide which comprises a nickel alloy, the Doan and Takeuchi references also at the very least fail to teach or suggest the specific amounts (e.g. greater than 0 to about 20 %) for the metal constituents of the nickel alloy layer as essentially recited in claims 1, 12, 19 and 23.

Moreover, the Maex reference fails to cure the above noted deficiencies of the Doan and Takeuchi references for at least the reasons set forth below. Although Maex discusses alloys which include nickel, the Maex reference still relates to different alloys than recited in claims 1, 12, 19 and 23. Rather, in all of the embodiments discussed in Maex, the alloys all include cobolt (Co). **(See abstract and disclosure of the Maex reference).**

In contrast, the nickel alloy layer for silicide recited in claims 1, 12, 19 and 23, as amended, do not include cobolt. It is well known in the art that alloys which include cobolt are not the same as alloys which do not include cobolt and may also have differing properties (e.g. physical and chemical properties) from one another. Thus, Maex reference relates to different alloys than a nickel alloy layer including greater than 0 to about 20 % of a material selected from the group consisting essentially of Ta, Zr, Ti, Hf, W, Pt, Pd, V, Nb, or any combination thereof, as essentially recited in claims 1, 12, 19 and 23.

In sum, Doan and Takeuchi do not teach or suggest all of the features recited in claims 1, 12, 19 and 23. Rather, as discussed above, Doan and/or Takeuchi fail to teach or suggest any alloy layers for silicide, let alone the specific nickel alloy layer for silicide as required by claims 1, 12, 19 and 23. Moreover, the Maex reference, as discussed, relates to different alloy layers than recited in claims 1, 12, 19 and 23 because at the very least the alloy layers described in all of the embodiments of Maex all include cobolt. Consequently, even if Doan and/or Takeuchi

were modified to include the alloy layers described in Maex, with this combination, one skilled in the art may at best arrive at a method which forms an alloy layer including cobalt and certain other metals such nickel, but this type of alloy layer, as discussed is not the same as the nickel alloy layer for silicide recited in claims 1, 12, 19 and 23 which does not include cobalt. Thus, this combination of Doan and/or Takeuchi with Maex would still fail to teach or suggest all of the features recited in claims 1, 12, 19 and 23.

In addition, Catabay, Jaiswal and Hill references each fail to cure the above noted deficiencies of the Doan, Takeuchi and Maex references because the Catabay, Jaiswal and Hill references also at the very least fail to teach or suggest a method of fabricating a semiconductor device, which includes a Ni-based metal layer comprised of the nickel alloy for silicide which is a nickel alloy layer including greater than 0 to about 20 % of a material selected from the group consisting essentially of Ta, Zr, Ti, Hf, W, Pt, Pd, V, Nb, or any combination thereof, as essentially recited in claims 1, 12, 19 and 23.

Therefore, for at least the reasons set forth above, removal of the rejections to claims 1, 12, 19 and 23 is respectfully requested. As claims 2 and 5-8 depend from and incorporate all of the limitations of claim 1, claims 13 and 16-18 depend from and incorporate all of the limitations of claim 12, claim 22 depends from and incorporate all of the limitations of claim 19, and claim 26 depends from and incorporate all of the limitations of claim 23, withdrawal of the rejections to these dependent claims is also requested. Moreover, as claims 27-30 depend from and incorporate all of the limitations of claim 1, 12, 19 and 23, respectively, removal of the rejections to these dependent claims is likewise requested.

In addition to the reasons mentioned above, claims 27-30 are even further distinguishable over all of the cited references for at least the following reasons. For instance, Takeuchi is completely silent regarding using any of the following possible metal constituents :Ta, Zr, Hf, Pt, Pd, V, Nb as part of a nickel alloy layer as essentially recited in claims 27-30. Furthermore, the Maex reference fails to cure the above deficiencies of Takeuchi. Although the Maex references describes use of some of the metal constituents which are recited in claims 27-30, all of the embodiments of Maex relate to alloys which include cobalt. As claims 27-30 do not include

cobalt as part of the nickel alloy layer for silicide, the alloys of Maex are different from the those recited in these claims, and thus even if the teachings of Maex were applied to the Takeuchi or Doan references, one skilled in the art would still not arrive at the same nickel alloy layer for silicide as recited in claims 27-30.

Accordingly, for at least the reasons set forth above, claims 27-30 are patentable over the Doan, Takeuchi, Catabay, Jaiswal, Hill and Maex references alone or in combination.

Lastly, new claim 31 is patentable over the Doan, Takeuchi, Catabay, Jaiswal, Hill and Maex references for at least the reasons set forth above with regard to claim 27.

#### **IV. CONCLUSION**

For the foregoing reasons, applicants respectfully submit that the instant application is in condition for allowance. Early notice to that end is earnestly solicited.

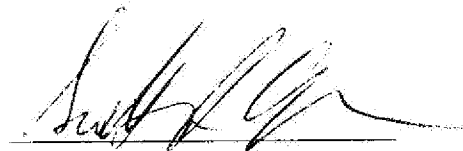
If a telephone conference would be of assistance in furthering prosecution of the subject application, applicants request that the undersigned be contacted at the number below.

Respectfully submitted,

Dated:

2/27/07

By:



Scott L. Appelbaum  
Reg. No. 41,587  
Attorney for Applicants

F. Chau & Associates, LLC  
130 Woodbury Road  
Woodbury, NY 11797  
Tel: (516) 692-8888  
Fax: (516) 692-8889